IN THE CLAIMS:

1. (Original) A method, comprising:

determining a worst-case impedance of a power supply loop coupled to a power input of a die;

determining a reference voltage at the power input of the die associated with an average current generated at a power supply included in the power supply loop;

measuring a maximum change in a current at the power input of the die; and

calculating an estimate of a worst-case voltage at the power input of the die based upon the worst-case impedance, the reference voltage, and the maximum change in the current.

2. (Original) The method of claim 1, wherein the determining of the worst-case impedance of the power supply loop coupled to the power input of the die further comprises:

measuring a voltage V(t) at the power input of the die while executing an alternating hot and cold process on the die, wherein the alternating hot and cold process generates a current at the power input of the die that approximates a periodic waveform; and

storing the voltage V(t) in a memory.

3. (Original) The method of claim 2, wherein the determining of the worst-case impedance of the power supply loop coupled to the power input of the die further comprises identifying a pre-transition voltage before a half-period of the voltage V(t), and a number of maximum voltages and a number of minimum voltages of a response of the voltage V(t) within the half-period of the voltage V(t).

4. (Original) The method of claim 3, wherein the determining of the worst-case impedance of the power supply loop coupled to the power input of the die further comprises determining a period of the alternating hot and cold process to be at least as great as X/f_1, where f_1 is defined as a frequency of a right-most peak corresponding to a resonance in the power supply loop as depicted in a graph of the impedance of the power supply loop as a function of frequency, and X is specified so as to include the maximum voltages and the minimum voltages within the half-period of the voltage V(t), wherein the maximum and minimum voltages comprise all significant maximum voltages and all significant minimum voltages of the response of the voltage V(t).

5. (Original) The method of claim 3, wherein the determining of the worst-case impedance of the power supply loop coupled to the power input of the die further comprises:

measuring a first current at the power input of the die during the execution of a hot process on the die;

measuring a second current at the power input of the die during the execution of a cold process on the die;

determining a difference between the first and second currents; and

calculating the worst-case impedance from the pre-transition voltage, the maximum voltages and minimum voltages of the response of the voltage V(t), and the difference between the first and second currents at the power input of the die.

6. (Original) The method of claim 5, wherein the calculating of the worst-case impedance from the pre-transition voltage, the maximum voltages and the minimum voltages of the response of the voltage V(t), and the difference between the first and second currents in the current at the power input of the die further comprises calculating the worst-case impedance using the equation

$$R_w = \frac{\sum_{i=0}^{M} |V_{2i} - V_{2i+1}|}{\Delta I_{dd}},$$

where R_w is the worst-case impedance, M is the total number of pairs of measured voltages including the pre-transition voltage, the maximum voltages, and the minimum voltages of the response, V_x is the magnitude of the respective maximum and minimum voltages of the response, and ΔI_{dd} is the difference between the first and second currents at the power input of the die.

7. (Original) The method of claim 2, wherein the determining of the reference voltage at the power input of the die associated with an average current generated at the power supply included in the power supply loop further comprises:

determining a resistance of the power supply loop;

determining an average current at a power supply of the power supply loop; and

calculating the reference voltage at the power input of the die based upon the resistance of the power supply loop, the average current, and a voltage generated by a power supply in the power supply loop.

8. (Original) The method of claim 7, wherein the determining of the resistance of the power supply loop further comprises:

generating a constant current at the power input of the die by executing a constant process on the die;

measuring the constant current;

measuring the voltage at the power input of the die while the constant process is executed; and

calculating the resistance of the power supply loop based upon the voltage at the power input of the die, the constant current, and the voltage generated by a power supply in the power supply loop.

9. (Original) The method of claim 7, wherein the determining of the average current at the power supply of the power supply loop further comprises:

executing an aggressive process on the die;

measuring a current at the power supply while the aggressive process is executed on the die; and

determining the average current from the current measured at the power supply while the aggressive process was executed on the die.

10. (Original) The method of claim 1, wherein the measuring of the maximum change in the current at the power input of the die further comprises:

executing an aggressive process on the die; and

measuring and storing the current at the power input of the die as a function of time.

11. (Original) The method of claim 1, wherein the calculating of the estimate of the worst-case voltage at the power input of the die further comprises calculating an estimate of a maximum worst-case voltage.

12. (Original) The method of claim 1, wherein the calculating of the estimate of the worst-case voltage at the power input of the die further comprises calculating an estimate of a minimum worst-case voltage.

13. (Original) A computer program embodied in a computer readable medium, comprising:

code that determines a worst-case impedance of a power supply loop coupled to a power input of a die; and

code that calculates an estimate of the worst-case voltage at the power input of the die based upon a number of factors, including:

the worst-case impedance;

an estimated maximum change in a current at the power input of the die; and

a reference voltage at the power input of the die, the reference voltage being associated with an average current generated at a power supply included in the power supply loop.

14. (Original) The computer program embodied in the computer readable medium of claim 13, further comprising code that inputs a data file that embodies a measure of a voltage V(t) at the power input of the die while executing an alternating hot and cold process on the die, wherein the alternating hot and cold process generates a current at the power input of the die that approximates a periodic waveform.

15. (Original) The computer program embodied in the computer readable medium of claim 14, wherein the code that determines the worst-case impedance of the power supply loop coupled to the power input of the die further comprises code that identifies a pre-transition voltage before a half-period of the periodic waveform and a number of maximum voltages and minimum voltages of the response of the voltage V(t) within the half-period.

16. (Original) The computer program embodied in the computer readable medium of claim 15, wherein the code that determines the worst-case impedance of the power supply loop coupled to the power input of the die further comprises:

code that determines a difference between a first current measured at the power input during the execution of a hot process on the die and a second current measured at the power input during the execution of a cold process on the die; and

code that calculates the worst-case impedance from the pre-transition voltage, the maximum voltages, and the minimum voltages of the response of the voltage V(t) and the difference between the first current and the second current.

17. (Original) The computer program embodied in the computer readable medium of claim 16, wherein code that calculates the worst-case impedance from the pre-transition voltage, the maximum voltages, and the minimum voltages of the response of the voltage V(t) and the difference between the first current and the second current further comprises code that calculates the worst-case impedance using the equation

$$R_w = \frac{\sum_{i=0}^{M} |V_{2i} - V_{2i+1}|}{\Delta I_{dd}},$$

where R_w is the worst-case impedance, M is the total number of pairs of measured voltages including the pre-transition voltage and the maximum and minimum voltages of the response, V_x is the magnitude of the respective maximum and minimum voltages of the response, and ΔI_{dd} is the difference between the first current and the second current at the power input of the die.

18. (Original) The computer program embodied in the computer readable medium of claim 13, wherein the code that calculates the estimate of the worst-case voltage at the power input of the die further comprises code that calculates an estimate of a maximum worst-case voltage.

19. (Original) The computer program embodied in the computer readable medium of claim 13, wherein the code that calculates the estimate of the worst-case voltage at the power input of the die further comprises code that calculates an estimate of a minimum worst-case voltage.

20. (Original) A system for determination of a worst-case voltage, comprising:

a processor circuit having a processor and a memory;

a worst-case voltage calculator stored in the memory and executable by the processor, the worst-case voltage calculator comprising:

logic that determines a worst-case impedance of a power supply loop coupled to a power input of a die; and

logic that calculates an estimate of the worst-case voltage at the power input of the die based upon a number of factors, including:

the worst-case impedance;

an estimated maximum change in a current at the power input of the die; and

a reference voltage at the power input of the die, the reference voltage being associated with an average current generated at a power supply included in the power supply loop.

21. (Original) The system of claim 20, wherein the logic that determines the worst-case impedance of the power supply loop coupled to the power input of the die further comprises logic that inputs a data file that embodies a measure of a voltage V(t) at the power input of the die while executing an alternating hot and cold process on the die, wherein the alternating hot and cold process generates a current at the power input of the die that approximates a periodic waveform.

22. (Original) The system of claim 21, wherein the logic that determines the worst-case impedance of the power supply loop coupled to the power input of the die further comprises logic that identifies a pre-transition voltage before a half-period of the periodic waveform, and a number of maximum voltages and minimum voltages of the response of the voltage V(t) within the half-period of the periodic waveform.

23. (Original) The system of claim 22, wherein the logic that determines the worst-case impedance of the power supply loop coupled to the power input of the die further comprises:

logic that determines a difference between a first current measured at the power input during the execution of a hot process on the die and a second current measured at the power input during the execution of a cold process on the die; and

logic that calculates the worst-case impedance from the pre-transition voltage, the maximum voltages, and the minimum voltages of the response of the voltage V(t), and the difference between the first current and the second current.

24. (Original) The system of claim 23, wherein logic that calculates the worst-case impedance from the pre-transition voltage, the maximum voltages, and the minimum voltages of the response of the voltage V(t), and the difference between the first current and the second current further comprises logic that calculates the worst-case impedance using the equation

$$R_w = \frac{\sum_{i=0}^{M} |V_{2i} - V_{2i+1}|}{\Delta I_{dd}},$$

where R_w is the worst-case impedance, M is the total number of pairs of measured voltages including the pre-transition voltage and the maximum and minimum voltages of the response, V_x is the magnitude of the respective maximum and minimum voltages of the response, and ΔI_{dd} is the difference between the first current and the second current at the power input of the die.

25. (Original) The system of claim 20, wherein the logic that calculates the estimate of the worst-case voltage at the power input of the die further comprises logic that calculates an estimate of a maximum worst-case voltage.

26. (Original) The system of claim 20, wherein the logic that calculates the estimate of the worst-case voltage at the power input of the die further comprises logic that calculates an estimate of a minimum worst-case voltage.

27. (Original) A system for determination of a worst-case voltage, comprising:

means for determining a worst-case impedance of a power supply loop coupled to a power input of a die; and

means for calculating an estimate of the worst-case voltage at the power input of the die based upon a number of factors, including:

the worst-case impedance;

an estimated maximum change in a current at the power input of the die; and

a reference voltage at the power input of the die, the reference voltage being associated with an average current generated at a power supply included in the power supply loop.